volatile organic compound destruction system **10** results in substantially complete destruction of the volatile organic compound while reducing the amount of primary fuel required to operate an engine for the generation of electricity.

Thus, it will be appreciated that device **10** provides significant advantages over prior art designs for destruction of VOCs. For example, in accordance with experiments preformed using devices embodying preferred aspects of the present invention, substantial destruction of VOC laden air efficiency (e.g. at rates above 99.5%) at a level of about 6200 ft^3/min can be obtained with the production of a nominal 525 kw of electrical power.

To illustrate the overall impact of the present invention, consider a typical plant using 640,000 kw hours per month with a need to consume 12,000 cubic feet per minute of air laden with 3,500 parts per million of a VOC. Consider further that the plant consumes 97,000 therms of fossil fuel each month. Without control, over 800 metric tons per year of VOC's are released into the atmosphere.

While prior art techniques (e.g. use of a thermal oxidizer) may reduce the emission to less than 50 metric tons per year of VOC's , use of such devices increases the plant energy consumption to about 125,000 therms per month.

In contradistinction, through use of a device embodying the present invention, effective VOC control is enabled with less energy. Specifically, in this example, the energy consumed and therefore, total fossil fuels burned, falls to 81,000 therms per month. Not only are the total operating costs for the plant reduced, but there is also a net reduction in the emission of carbon dioxide, nitric oxide and sulfur oxide. The sum effect of use of the present invention to control volatile organic emissions is thus cleaner air, less fossil fuel consumption and resulting lower costs.

It will be understood that the foregoing description is of the preferred exemplary embodiments of the invention, and that the invention is not limited to the specific forms shown. Various modifications may be made in the design and arrangement of the elements set forth herein without departing from the scope of the invention as expressed in the appended claims.

We claim:

1. A system for the destruction of volatile organic compounds (VOCs) comprising:

a combustor;

a reaction chamber connected to said combustor; and,

an engine connected to said reaction chamber;

wherein said system is configured to receive a primary fuel and a secondary fuel, said secondary fuel comprising VOC laden air, and wherein said primary fuel is combusted in said combustor and said secondary fuel is combusted in said combustor and said reaction chamber.

2. The system of claim **1** further comprising a recovery generator connected to said engine, wherein said engine drives said recovery generator such that said generator generates electricity.

3. The system of claim **2** wherein said engine comprises a gas turbine engine and includes a compressor.

4. The system of claim **3** wherein said compressor comprises a multi-stage compressor and said system further comprises an air inlet duct for the communication to the system of said secondary fuel, said air inlet duct communicating with said compressor.

5. The system of claim **4** wherein said secondary fuel is compressed within said compressor, said compressor further comprising an outlet which directs said compressed secondary fuel to said combustor and said reaction chamber.

6. The system of a claim **5** further comprising a primary fuel source, said primary fuel source having an outlet operatively communicating with said combustor.

7. The system of claim **5** wherein said reaction chamber defines a passageway, said passageway communicating with said compressor outlet and said combustor and the interior of said reaction chamber.

8. The system of claim **7** wherein said combustor is attached to said reaction chamber such that said combusted primary fuel interacts with said compressed secondary fuel to substantially destruct said volatile organic compounds contained in said secondary fuel and to provide a mixed stream to power said gas turbine engine.

9. A system for the destruction of volatile organic compounds (VOCs) and the co-generation of power comprising:

a power generator including a compressor and a turbine;

a reaction chamber having first and second sections, said first section communicating with an outlet of said compressor and said second section communicating with an inlet to said turbine;

a combustor attached to said reaction chamber, said combustor having an inlet for receiving a primary fuel supply;

an air inlet connected to said compressor such that operation of said compressor draws in inlet air laden with VOCs and compresses said inlet air;

wherein said reaction chamber first section communicates with the interior of said reaction chamber and said combustor such that said compressed inlet air is directed by said first section to said combustor and said reaction chamber;

wherein said combustor is configured to combust said primary fuel supply and said combustor and said reaction chamber are configured to destroy said VOCs in said inlet air and direct the combustion gases through said turbine inlet to drive said turbine.

10. The system of claim **9**, wherein said power generator comprises a gas turbine engine.

11. The system of claim **9**, wherein said air inlet includes an air inlet sensor configured to measure the amount of VOC's in said inlet air; said primary fuel is provided by a primary fuel system, that includes a sensor configured to measure the flow of said primary fuel directed to said combustor; and, said power generator includes a sensor configured to measure the speed of said turbine.

12. The system of claim **11**, further comprising a computer control system configured to receive said sensor measurements and adjust said flow of said primary fuel.

13. The system of claim **9**, further comprising a generator to initially power said compressor and said turbine.

14. The system of claim **13** further comprising a power recovery system configured to harness the energy created by operation of said turbine and means for directing a portion of said harnessed energy to said compressor to power said compressor without assistance of said generator.

15. The system of claim **14** further comprising a heat recovery system, said heat recovery system communicating with an outlet from said turbine and configured to convert the heat generated through operation of said turbine into electrical power.

16. A system comprising:

means for providing to the system a primary fuel;

means for providing to the system a secondary fuel comprising volatile organic compound laden (VOC) air;

means for compressing said secondary fuel;

means for combusting said primary and secondary fuels to substantially destroy said VOCs in said secondary fuel and generate a stream of combustion gases; and

means for generating power attached to said combustion means for receiving said stream of combustion gases and generating power.

17. The system of claim 16 wherein said combustion means further comprises a first combustion means for combusting said primary fuel and a portion of said secondary fuel to produce a first stream of combustion gases and a second combustion means for receiving said first stream and reacting said first stream with the remainder of said secondary fuel to provide a second stream of combustion gases, said power generation means configured to receive said second stream of combustion gases.

* * * * *